

CLAIMS

What is claimed is:

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1. A medical information transmitter comprising:
 2. A) a data interface for acquiring a medical data file having an application entity title;
 3. B) an assembly unit configured to assemble the medical data to form data packets;
 4. C) a remapping unit configured to attach an address to the packets for identifying a disassembly structure;
 5. D) a processing unit configured to encrypt the packets across protocol layers for decryption by the disassembly structure; and
 6. E) a network interface configured to transmit the packets into a public network for receipt at the disassembly structure.
10. 2. The information transmitter of claim 1, wherein the processing unit is further configured to authenticate the packets across protocol layers.
11. 3. The information transmitter of claim 2, wherein the processing unit is further configured to provide key management to the packets across protocol layers.

1 4. The information transmitter of claim 1, wherein the processing unit is configured to
2 encrypt the packets in a manner compliant with IP Security Standards.

1 5. The information transmitter of claim 1, wherein the processing unit is configured to
2 authenticate and provide key management in a manner compliant with IP Security
3 Standards.

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1 6. The information transmitter of claim 4, wherein the processing unit is further
2 configured to encapsulate each of the packets into outer packets.

1 7. The information transmitter of claim 1, further including a firewall.

1 8. The information transmitter of claim 7, wherein the firewall includes a first network port
2 at the data interface and a second network port at the network interface.

1 9. The information transmitter of claim 1, wherein the remapping unit attaches the
2 address by:

- 3 (i) examining the packet content;
- 4 (ii) determining a receiving station based on the content;
- 5 (iii) determining the address that identifies the disassembly structure
6 associated with the receiving station; and

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(iv) attaching the address to the packets.

1 10. The information transmitter of claim 1, wherein the attached address is an alias AE
2 title and the remapping unit is configured to attach the alias AE title by:

- 3 (i) accepting an AE title that identifies a receiving station;
- 4 (ii) cross-referencing from a relational database, the AE title with the
5 alias AE title that identifies a disassembly structure associated with
6 the receiving station; and
7 (iii) attaching the alias AE title to the packets.

1 11. The information transmitter of claim 1, wherein the attached address is a routable IP
2 address and the remapping unit is configured as an NAT to attach the routable IP
3 address by:

- 4 (i) accepting a private IP address that identifies a receiving station;
- 5 (ii) cross-referencing from a relational database, the private IP address
6 with the routable IP address that identifies a disassembly structure
7 associated with the receiving station; and
8 (iii) attaching the routable IP address to the packets.

1 12. The information transmitter of claim 10, further comprising an updating unit for
2 adding the alias AE titles to the relational database.

1 13. The information transmitter of claim 12, wherein the updating unit adds the alias
2 AE titles to the relational database by synchronous asymmetric replication.

1 14. The information transmitter of claim 1, wherein the public network comprises
2 conventional telephone lines, ADSL, ISDN, fiber optic cables, ATM network links,
3 DSL connections, satellite links, or a combination thereof.

1 15. The information transmitter of claim 1, wherein the assembly unit is further
2 configured to assemble between 0.1 megabyte and 5.0 megabyte portions of medical
3 data into each of the packets.

1 16. The information transmitter of claim 1, wherein the assembly unit is further
2 configured to assemble between 50 bytes and 500 bytes portions of medical data
3 into each of the packets.

1 17. The information transmitter of claim 1, further comprising an acknowledgement
2 unit configured to receive confirmation of completed packet transfers from the
3 disassembly structure within a threshold time.

1 18. The information transmitter of claim 16, wherein the acknowledgment unit is
2 further configured to cause the information transmitter to resend only those portions
3 of the data file to which no acknowledgments are received within the threshold
4 time.

1 19. The information transmitter of claim 1, wherein the medical data file comprises
2 text, image, overlay, 3-D volume, waveform, curve, video, and/or sound data, or
3 any combination thereof.

1 20. The information transmitter of claim 19, wherein the medical data file is of a form
2 conformant with the DICOM Standards and/or HL7 Standards.

1 21. A medical virtual private network system comprising:

2 A) a medical modality configured to generate medical data and
3 comprising a mapping unit for attaching an application entity title to the medical
4 data for identifying a medical information transmitter;

5 B) the medical information transmitter comprising:

6 (i) a data interface communicatively coupled to the medical
7 modality for acquiring the medical data from the medical
8 modality;

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- 1 22. The network system of claim 21, wherein the medical modality comprises radiology
 - 2 equipment.
 - 1 23. The network system of claim 21, further comprising a plurality of medical
 - 2 modalities.
 - 1 24. The network system of claim 21, further comprising a disassembly structure
 - 2 configured to decrypt the packets.
 - 1 25. The network system of claim 24, further comprising a plurality of disassembly
 - 2 structures.
 - 1 26. The network system of claim 24, wherein the disassembly structure is a second
 - 2 medical information transmitter.

1 27. The network system of claim 24, further comprising a receiving station.

1 28. The network system of claim 24, further comprising a plurality of receiving stations.

1 29. A computer readable medium having stored therein a plurality of sequences of
2 instructions, which, when executed by a processor in a transmitter, cause the
3 processor to:

4 A) assemble medical data into packets;

5 B) attach an address to the packets for identifying a disassembly structure;

6 C) encrypt the packets across protocol layers for decryption by the disassembly
7 structure; and

8 D) send the packets into a public network for receipt at the disassembly
9 structure.

1 30. The computer readable medium of claim 29, further including additional sequences
2 of instructions, which, when executed by the processor, cause the processor to
3 authenticate the packets across protocol layers.

1 31. The computer readable medium of claim 30, further including additional sequences
2 of instructions, which, when executed by the processor, cause the processor to
3 provide key management to the packets across protocol layers.

1 32. The computer readable medium of claim 29, wherein the encryption is compliant
2 with IP Security Standards.

1 33. The computer readable medium of claim 31, wherein the authentication and key
2 management are compliant with IP Security Standards.

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1 34. The computer readable medium of claim 29, wherein the address is an alias AE title
2 and the attaching of the address is by:

- 3 (i) accepting an AE title that identifies a receiving station;
- 4 (ii) cross-referencing from a relational database, the AE title with the
5 alias AE title that identifies a disassembly structure associated with
6 the receiving station; and
- 7 (iii) attaching the alias AE title to the packets.

1 35. The computer readable medium of claim 29, wherein the address is a routable IP
2 address and the attaching of the address is by NAT including the steps of:

- 3 (i) accepting a private IP address that identifies a receiving station;
- 4 (ii) cross-referencing from a relational database, the private IP address
5 with the routable IP address that identifies a disassembly structure
6 associated with the receiving station; and
- 7 (iii) attaching the routable IP address to the packets.

- 1 36. Computer readable instructions, which when executed cause a processor to:
- 2 A) assemble medical data into packets;
- 3 B) attach an address to the packets for identifying a disassembly
- 4 structure;
- 5 C) encrypt the packets across protocol layers for decryption by the
- 6 disassembly structure; and
- 7 D) send the packets into a public network for receipt at the disassembly
- 8 structure.

- 1 37. The computer readable instructions of claim 36, wherein the address is an alias AE
2 title and the attaching of the address is by:
- 3 (i) accepting an AE title that identifies a receiving station;
- 4 (ii) cross-referencing from a relational database, the AE title with the
5 alias AE title that identifies a disassembly structure associated with
6 the receiving station; and
- 7 (iii) attaching the alias AE title to the packets.

- 1 38. The computer readable instructions of claim 36, wherein the address is a routable IP
2 address and the attaching of the address is by NAT including the steps of:

- 3 (i) accepting a private IP address that identifies a receiving station;
- 4 (ii) cross-referencing from a relational database, the private IP address
- 5 with the routable IP address that identifies a disassembly structure
- 6 associated with the receiving station; and
- 7 (iii) attaching the routable IP address to the packets.

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- 1 39. A method, comprising the steps of:
- 2 A) assembling medical data into packets;
- 3 B) attaching an address to the packets for identifying a disassembly
- 4 structure;
- 5 C) encrypting the packets across protocol layers for decryption by the
- 6 disassembly structure; and
- 7 D) sending the packets into a public network for receipt at the
- 8 disassembly structure.

- 1 40. The method of claim 39, further including the step of compressing the packets using
2 at least one of a wavelet, a motion wavelet, an MPEG, a motion JPEG, a Lempel
3 Ziv or fractal compression scheme.

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- 41 1 42. The method of claim 39, wherein the step of encrypting is compliant with IPSec
2 Standards.

1 4743. The method of claim 42, further including the step of encapsulating the packet into
2 an outer packet.

1 4344. The method of claim 43, wherein the outer packet includes an encryption field.

1 4445. The method of claim 39, wherein the address is an alias AE title and the attaching of
2 the address includes the steps of:

- 3 (i) accepting an AE title that identifies a receiving station;
- 4 (ii) cross-referencing from a relational database, the AE title with the
5 alias AE title that identifies a disassembly structure associated with
6 the receiving station; and
- 7 (iii) attaching the alias AE title to the packets.

1 4546. The method of claim 39, wherein the address is a routable IP address and the
2 attaching of the address is by NAT and includes the steps of:

- 3 (i) accepting a private IP address that identifies a receiving station;
- 4 (ii) cross-referencing from a relational database, the private IP address
5 with the routable IP address that identifies a disassembly structure
6 associated with the receiving station; and
- 7 (iii) attaching the routable IP address to the packets.

1 47. The method of claim 39, further including the step of converting the medical data to
2 be compliant with the DICOM Standards after the packets are received at the
3 disassembly structure.

1 48. A method of transmitting medical information comprising:
2 A) assembling a medical data file into packets;
3 B) sending the packets into a public network for receipt at a disassembly
4 structure;
5 C) considering whether an acknowledgement of completed packet transfer
6 is received from the disassembly structure within a threshold time; and
7 D) resending into the public network only that portion of the medical data
8 file to which no acknowledgment is received within the threshold time.

1 49. The method of claim 48, wherein between 0.1 megabytes and 5.0 megabytes of
2 medical data is assembled into each packet.

1 50. A method acquiring medical information comprising:
2 A) receiving packets comprising medical information sent by sent by a
3 transmitter across a public network;
4 B) sending acknowledgments of successful transfer to the transmitter;
5 C) decrypting the packet to reveal an address of a receiving station;

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D) transferring the medical information to the receiving station.

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1 50 51. The method of claim 50, wherein the revealed address is an AE title of a receiving
2 station.

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The method of claim 50, further including the step of converting the medical
2 information to be compliant with the DICOM Standards prior to transferring the
3 information to the receiving station.

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